High Frequency Communication Systems

Term Project

In this project, you will design, build and test a phased array antenna with beamforming. These antennas are very powerful and form a backbone of the modern communication systems such as 5G and the millimetre-wave technologies. The contents of this project are attributed to Jon Kraft, Analog Devices who developed the system that you are going to make. Further information is available on [Jon's Github page](#).

The list of components and devices that you will need are available on the Github page. The School will provide the testing equipment such as the evaluation board, software defined radio, microwave signal mixer, and the RF regulator.

Guidelines

Each student is required to build their own phased array antenna. Although there is an example design available, we would like you to design your own antenna. For that, you can use simulation software such as `CST Suite` to first simulate and then fabricate the design.

Each of you will have to purchase the required items as listed in the documents available on [Jon's Github page](#).

Grading Criteria

As the project is the core component of the assessments in this course, we will assess your design, fabrication, presentation and report writing skills while grading your work. Of the total project related weightage, the below assessment scheme will be used:

Assessment Type	Weightage
Presentation	50 %
Demo	30 %
Report	20 %

Presentation

Please prepare a 10-minute presentation that discusses how you designed the antenna and what challenges you faced while building the system. Also, please mention how the design can be improved for future iterations. There will be a 2-3 minutes Q&A session at the end.

Demo

Please prepare a 5-minute video in which you demonstrate an operating phased array antenna. You may take some inspiration from Jon's webinar in the GNU Radio Workshop - [YouTube link](#).

Report

Each student will prepare a technical report based on the [two-column IEEE conference template format](#). You may use up-to 4 pages for the write-up. Please comply with the [IEEE formatting guidelines](#).

In case of any questions, please ask us.

Good Luck!